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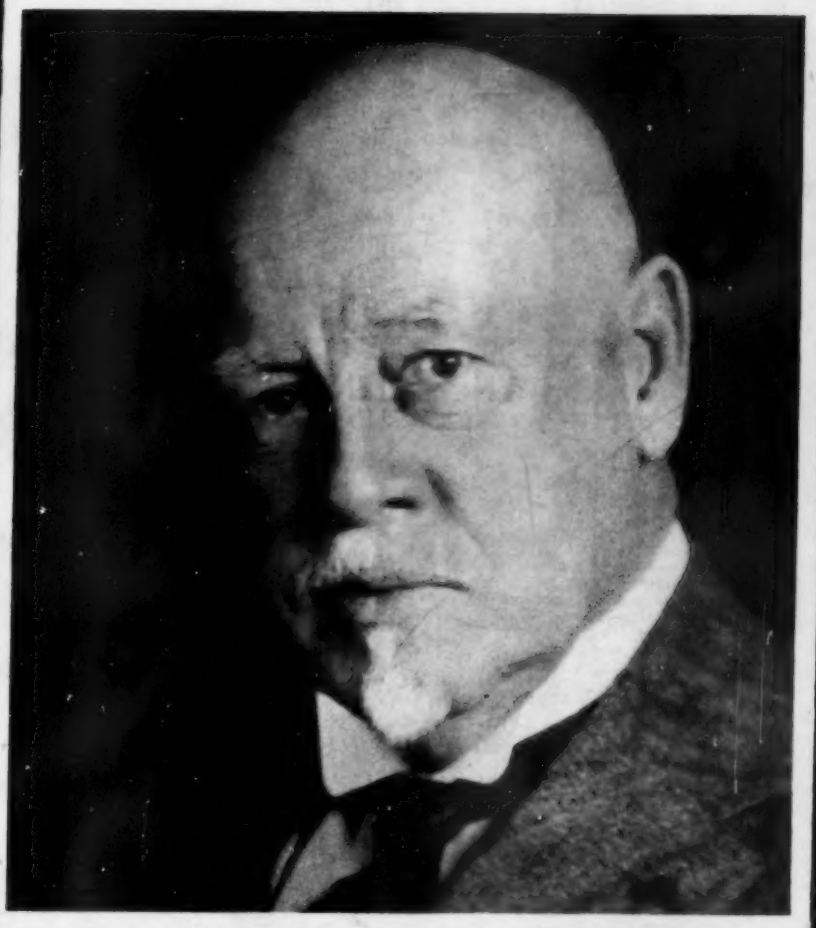
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



MAY 12, 1934

William Henry Welch (1850-1934)

See Page 293

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The Weekly Summary of Current Science

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DO YOU KNOW?

New South Wales is reviving cultivation of the passion vine for its fruit.

Milk sugar, used in making medicinal tablets, also goes into explosives.

In prehistoric times camphor was obtained from camphor trees by primitive methods.

Synagogues in ancient Palestine were set facing in the general direction of Jerusalem.

Hawaii has a species of goose that never goes near water except to drink, yet has web-feet like its ancestors and present-day relatives.

Night blindness—inability to see to a normal degree at night—may be a sign that an individual is getting too little vitamin A in the diet.

Besides the stalactites and stalagmites formed vertically in caves by the dripping of water, there are the less frequent helectites which are spirals.

There are more than 100,000 lepers in India.

Rubber was recommended for erasing pencil marks in a work written in 1770.

It is reported that Russia has over a thousand scientists working on problems of crop improvement.

High-yielding varieties of flax from India are being successfully grown in the Imperial Valley of California.

An all-metal office building was recently built in Richmond, Va., in which aluminum was the chief material.

California, which developed its orange industry on the navel orange, now has two million more Valancia orange trees than navel.

A Harvard scientist is taking anthropological measurements of 10,000 people in Ireland, to gain information on Irish racial types.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY

What king coveted Olynthos? p. 296.

What is the Chester-Beatty papyri? p. 298.

What Civil War battle was fought among Indian mounds? p. 299.

ASTRONOMY

How was the presence of phosphorus on the sun demonstrated? p. 297.

What is the big spot on Jupiter? p. 300. *Other Worlds—Edwin Lincoln Moseley—Appleton-Century*, 1933, $2.

ASTROPHYSICS

Do sunspots have anything to do with magnetic storms? p. 298.

CHEMISTRY

Would vitamin D in lipsticks do any good? p. 296.

What is good to remove stains from the skin? p. 299.

How can triple-weight hydrogen be made? p. 302.

ENGINEERING

How can ships be freed of shaft vibration? p. 296.

ETHNOLOGY

For which hand did Indians make their stone tools? p. 297.

EVOLUTION

What were the Ictidosaurians? p. 300. *The World of Fossils—Carroll Lane Fenton—Appleton-Century*, 1933, $2.

HISTORY

Who discovered the other side of America? p. 296.

MEDICINE

Who suffered most from parrot fever? p. 293.

How is smallpox vaccine made in a test tube? p. 296.

ORNITHOLOGY

Where does the pan-handler eagle live? p. 297.

PHYSICS

How much radium is there in rain? p. 292.

In which direction do electrons from thunderclouds go? p. 292.

How are 3,500,000-volt gamma rays produced? p. 298.

PHYSIOLOGY

What infantile gland has significance in adulthood? p. 291. *The Tides of Life—R. G. Hoskins—Norton*, 1933 $3.50.

What new vitamins still await discovery? p. 292.

What has been learned from Indian mystics about breathing? p. 302.

PSYCHOLOGY

What is the intelligence quotient? p. 294.

PUBLIC HEALTH

What did Dr. Welch consider essential to success in public health work? p. 293.

Is there any danger in food cooked in aluminum pots? p. 297.

ZOOLOGY

How do American fashions affect Asiatic snakes? p. 297.

How long has man been a giant-killer? p. 299.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied at Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

PHYSIOLOGY

New Thymus Gland Extract Speeds Sex and Growth

Mysterious Organ of Youth Visits Effects on Later Generations and May Speed Growth of Animals Practically

ONCE THE MOST mysterious part of the body, the thymus gland, which is closest to the heart of any of the endocrine organs, is now proved surprisingly to develop sexual precocity and speed up growth.

Practical applications to animals, perhaps even man, is foreseen because of an acceleration of the effects that occur as succeeding rat generations are given thymus extract injections. For instance, the future might see cattle raised in half the usual time.

Dr. Leonard G. Rowntree, formerly of the Mayo Clinic, since 1932 director of the Philadelphia Institute for Medical Research, uncovered this hidden effect of the thymus. He followed a lead given by Adolph M. Hanson, a Faribault, Minn., physician, who in time snatched from a busy practice made an extract of the thymus gland and reported that it seemed to lower blood pressure in the animals with which he worked. Dr. Rowntree was investigating this effect in rats when he discovered sexual and growth effects.

Daily Drops Injected

Injected daily with drops of powerful thymus extract, rats are affected markedly. Not so much the rats that first receive the injections, except that their families were more numerous. And their children's children, also treated with thymus extract, show little effect. But in the third generation, and in the fourth and fifth generations, sex came rushing earlier with more force, and size and growth were extraordinarily developed at early ages. The great grandratdaughters were rushed into parenthood by the physiological push of the thymus treatment. A third generation rat became a mother at 42 days and a fourth generation rat become a father at 29 days. They were correspondingly big and well-developed. Rats without benefit of thymus do not become parents until 50 to 70 days old.

Translated from rat to human terms, this means that girls or boys might become sexually mature at the age of 8 or 10 years, if they, their parents, grandparents and great grandparents had been treated with thymus extracts.

An ounce-weight pinkish mass in the upper chest of children, the thymus has hitherto interested physicians principally because it sometimes chokes little babies to death. It dwindles to seeming insignificance when the boy or girl develops the sexual attributes of maturity. Numerous earlier investigations had failed to show a function of the thymus gland.

Sweetbreads are Thymus

All animals from primitive fishes up to and including man have thymus glands. Calves' thymus glands are sweetbreads. It is from these that the Hanson extract is made. But you can eat this table delicacy without any worry that it will be forcing your grandchildren and great-grandchildren into early parenthood. Scientists long ago tried feeding thymus gland material to animals without any results.

Sexual precocity is perhaps the most striking effect of Dr. Hanson's thymus extract but general growth and development of the rats are also dramatically forced and they are unusually gentle and easy to manage. The third generations of the thymus-treated rats weighed a third again as much at birth as the average newborn rat. They could hear and they cut their teeth on their second day of life. By the fourth day their eyes were open and their bodies completely covered with hair. And they mate and bear offspring at a third of the age of their grandparents.

Only Way

In no other way can such effects be obtained. Growth alone might possibly be attained with vitamins but not precocity in rate of development and activity. Another important point is that the bones in thymus-treated rats are perfectly normal for their size regardless of age. This is not the case in abnormal size caused by some other gland effects.

Plunged headlong into maturity and old age, the thymus-injected rats lived faster and more furiously. They had faster and more merry lives at the expense of their youth. The blood count of the injected rats was the same as that in much older normal rats.

Since it is our human desire to live long, it may prove desirable to lessen the thymus effect in order to promote long life and a postponement of old

SPRING: AN IRONIC SYMPHONY

A Midwestern editor with an eye to ironic contrasts had his photographer concoct this photograph of his smoke-choked city as seen from a blossom-crowned bluff on the opposite side of one of its rivers. But the story is not unique: any one of a hundred cities in the soft-coal regions has a place where its veil of poison smoke may be regarded by a thoughtful citizen through a veil of hawthorn or wild crab-apple petals. . . . Eventually, of course, the smoke abolishes the petals.

age. This is at present purely speculative. Many more experiments are necessary. But those who breed animals for man's use or food may be able eventually to accelerate production enormously through use of thymus extracts.

Dr. Hanson who prepared the potent extract had previously given to the world a powerful extract of the parathyroids, tiny glands in the neck which govern bone formation. Because his extract was reported in a little-known medical journal, a Canadian scientist, Dr. J. B. Collip of McGill University, was credited with having first extracted the parathyroid hormone. But Dr. Hanson was able to prove his claim to priority and was awarded a patent for his product. Unselfishly sacrificing his chance for personal profit in the interest of the advancement of science, he assigned to the Smithsonian Institution in Washington all income and royalties accruing to him under the patent.

Three years ago Dr. Rowntree, then at the Mayo Clinic, gave the first dose of cortin to a human patient suffering from then-hopeless Addison's disease. His clinical use of the hormone extracted by Princeton University scientists from the adrenal gland cortex was the first application of this important substance for the saving of human life.

Science News Letter, May 12, 1934

PHYSIOLOGY

At Least Three Vitamins Still Await Discovery

DISCOVERIES of new vitamins and further effects of gland hormones were predicted by Dr. E. V. McCollum of the Johns Hopkins University and Dr. Oscar Riddle of the Carnegie Institution of Washington, who were presented gold medals of the American Institute in recognition of their researches.

"There is little reason to doubt that at least one new fat-soluble vitamin remains to be discovered," Dr. McCollum said, "and probably at least two more water-soluble vitamins exist."

Dr. McCollum discovered vitamin A in 1913, and since has been a leader in nutrition research.

All the main elements of hormonal control of reproduction appear now to be known, Dr. Riddle declared, in emphasizing that the women of the present generation are the first who could possibly know and learn the basis and the meaning of the cycles and adjustments which are peculiarly theirs. Not one of the four hormones chiefly involved in human or animal reproduction had been separated or assayed twelve years ago and the most recently separated is less than three years old.

Dr. Riddle, working at Cold Spring Harbor, N. Y., extracted the prolactin hormone from the anterior pituitary gland, demonstrated the thymovidin hormone of the mysterious thymus gland, and has done other important glandular researches.

Many new and spectacular researches in nutrition will come to light during the next ten or twenty years, Dr. McCollum believes. The recent discovery that paprika is a rich source of ascorbic acid or vitamin C suggests that research among plants of unusual or specialized structure may prove fruitful.

Sodium, calcium, magnesium, chlorine, iodine, phosphorus, sulfur, iron, copper and manganese are known to be indispensable in the diet. Yet with the exception of calcium, phosphorus and magnesium very little is known of the roles played by these essential substances.

Important as are the applications of nutrition discoveries to human health and well-being, as in the prevention of rickets, beri-beri, infantile scurvy and pellagra, Dr. McCollum foresees other advantages to be derived from them. Profits from the raising of farm animals may be increased enormously by applying present knowledge of proper feeding.

Science News Letter, May 12, 1934

PHYSICS

It's Raining Radium—But Not Much

RAIN BRINGS down radium, washing it out of the air, G. R. Wait and A. G. McNish of the Carnegie Institution of Wahington told members of the American Physical Society. But you need not go out with a bucket the next time it rains, for the quantity is exceedingly minute—to be measured only with delicate instruments that tell of the electrified or ionized state of the air. With such an instrument in the open near their laboratory, the two physicists found that as the rain began the ionization of the air increased rapidly, to fall off again when it stopped.

The decrease with time was of such a character, they said, "as to be explainable by assuming that decay-products of radium, principally radium B and radium C in equilibrium with it, are carried to the earth's surface by rain."

Science News Letter, May 12, 1934

PHYSICS

Penetrating Rays Sprayed Up From Thunderclouds

PENETRATING radiations resembling cosmic rays, but "softer," are thrown upward into the air from the tops of thunderstorm clouds, like spray from the tops of waves. They come to earth again to the eastward of the cloud, drawn down by the earth's magnetic field.

These radiations, which are made up of speeding negative electrons, were described before the meeting of the American Geophysical Union by Dr. B. F. J. Schonland, noted South African student of the physics of the air, who is visiting in the United States.

Dr. Schonland stated that when he began his investigations of penetrating radiations caused by lightning, he thought he would find electrons poured directly earthward as well as upward into the higher levels of the air; but this proved not to be the case. He has found that lightning-engendered radiations can influence cosmic-ray detecting instruments as much as a thousand miles away from a thunderstorm, and he stated that another investigator claims for them an even greater radius of action. But their effect is always felt to the eastward of the storm that gives them birth, never toward the west.

The research was undertaken with

the idea of finding out whether cosmic rays were entirely the product of thunderstorms, as one student of the subject had claimed. Dr. Schonland is convinced that this is not the case; nevertheless, there are enough lightning-caused penetrating radiations to make it necessary for researchers on cosmic rays to take them into account, if their figures are not to be falsified by thunderstorms.

Science News Letter, May 12, 1934

PUBLIC HEALTH

Dean of American Medicine Defined "New Public Health"

Dr. Welch, Before His Death, Summarized for Posterity Lessons of Fight for Better Health Which He Led

Before his death in his 85th year on April 30, Dr. Welch recorded phonographically at the request of Science Service an evaluation of the great crusade for a healthier nation, a campaign that he led so effectively. His words have added meaning as the nation mourns him.

By DR. WILLIAM H. WELCH

WE OWE primarily to the anti-tuberculosis crusade the development of "the new public health," characterized especially by efforts to educate the people in matters of public and personal hygiene. . . .

It is evident that a crusade directed in the first instance against a single disease, without losing sight of its immediate goal, has assumed in recent years the proportions of a general health movement and this not merely on the negative or preventive side, but even more on the positive side of improvement of the health and increase of the vitality of the whole community.

These newer directions of public and individual health, started by the anti-tuberculosis campaign, have been reenforced and greatly expanded by similar popular movements organized to promote maternity, infant and child hygiene, social hygiene, mental hygiene, the control of cancer, the prevention and relief of heart disease, and the end of like beneficent movements is not yet in sight.

Among the great lessons taught by these recent health movements is the necessity of securing by popular edution the cooperation of all the forces of society, both governmental and voluntary, in support of efforts of health departments and of the medical profession to prevent disease and to improve health.

See Front Cover

Another lesson is that the attack upon one disease may have incidental and often unexpected benefits not to be measured solely by lessening the incidence of the disease which is the immediate object of attack.

Still another lesson is that existing social, industrial and economic conditions set limits to what is at present attainable in the field of disease prevention.

The most important lesson of all is that success is dependent upon accurate knowledge concerning the causes and mode of spread of preventable diseases, and that hope of the future lies in the increases of useful knowledge by the methods of experimental science.

Science News Letter, May 12, 1934

MEDICINE

Vaccination Against Parrot Fever

THE heroic sacrifices of life and health made by workers in medical laboratories throughout the world have aroused universal sympathy and admiration. News that hazards faced daily by these self-sacrificing men and women are gradually being lessened is particularly heartening.

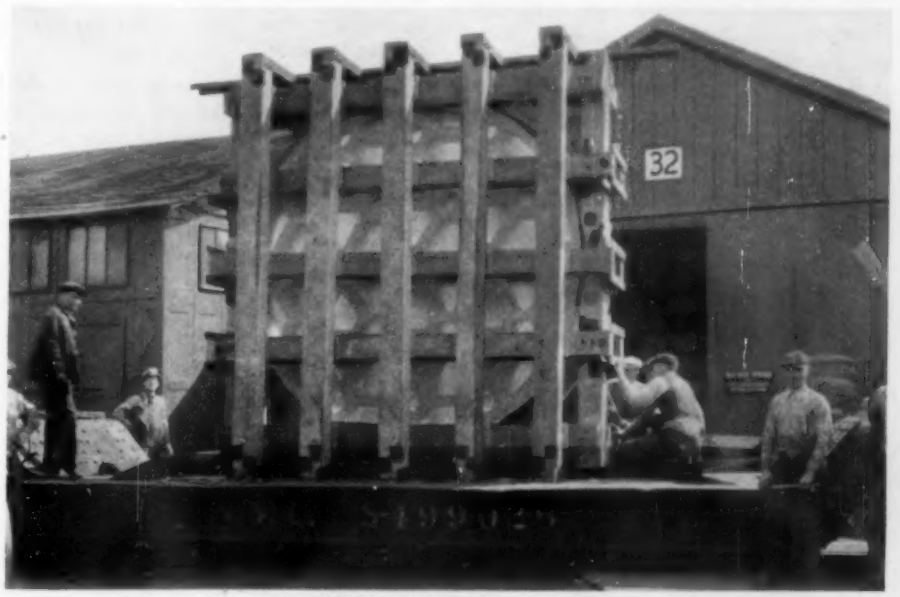
The latest achievement is protective vaccination against psittacosis or parrot fever, announced by Dr. Thomas M. Rivers of the Rockefeller Institute for Medical Research in New York City.

Seven laboratory workers have already been vaccinated. Five or six doses of live virus varying in strength from 10,000 to 10 million times the dose that will kill a mouse were injected into their muscles in order to establish in these workers a resistance to the dangerous organism which causes the disease.

Parrot fever has been particularly hard on laboratory workers who promptly met the challenge of this new and mysterious malady when it broke out all over the world in 1929, following the distribution of diseased parrots from Argentina and Brazil in that year.

Eleven cases developed at the U. S. Public Health Service's National Institute of Health in Washington.

Science News Letter, May 12, 1934



CORRECTOR OF TELESCOPES

The 120-inch disc, the largest to reach this stage of completion, is safely designed, cast, annealed, tested, and shipped to the California Institute of Technology where it will be ground to a plane for testing the 200-inch mirror. It was cast at the Corning Glass Works, preparatory to pouring the glass for the great 200-inch mirror.

PSYCHOLOGY

How Old is America Mentally?

Education Expert Challenges Idea That We are Nation of 12-Year-Olds But Psychologists Find Figure Not Far Wrong

By MARJORIE VAN DE WATER

IS AMERICA mentally a nation of twelve-year-olds?

Much heated argument has arisen on this question, most of it due to an unfortunate misunderstanding of what psychologists have discovered with regard to the intelligence of the children and grown-ups of the nation.

Latest to challenge the assertion officially is an expert in the U. S. Office of Education at Washington, Dr. David Segel. The mental age of adults in the United States is 17.7 years, Dr. Segel contends, and he deplores the fact that the 12-year figure has been used as an argument for lowering the education or cultural level of newspapers, magazines, movies and radio presentations.

The pronouncement that the national intelligence is greater than has been stated by psychologists and educators will be welcome to many who are loath to consider themselves part of a mentally 12-year-old population. They may, however, wonder whether it is so much better to be 17 than 12 in mental age.

Looked at from another point of view, however, a 12-year mental level is not so alarming. The parents of the modern young adolescent are usually quite willing to admit that Miss 12-years and her brother are entirely capable of outwitting their elders. They surpass many older persons in ability to learn.

Mental Age Is New

All this talk about mental age is comparatively new.

The giving of examinations to measure what children have learned in school is a very ancient custom, but the idea of applying some sort of yardstick to measure the child's innate capacity for mental penetration and organization is a fairly new one. Even today, despite the fact that psychological examinations, or mental tests, are routine in a great many of the more modern schools, and practically any parent who wishes the information can find out whether his or her child has a high or low mental age or "I.Q.," still many are puzzled to know just what the psychologists are driving at when they talk of a mental age of 12 years, or 6 years, or 8 years.

To many it is confusing if not actually absurd to say that some graybearded old patriarch has a mental age of 8 or 10, although they are ready to use this term "childish" about many who are very old.

Most people picture mentality as continuing to develop and grow throughout the entire span of human life. How then, they ask, can the average mentality of all the adults of the United States be the same as that of school children in the seventh or eighth grade of public school?

Not Experience

The answer becomes clear, however, when it is understood what psychologists mean by intelligence and mental age. Intelligence, as the term is used precisely by scientists, does not include education, or skills, or the "wisdom" gained as a result of experience in the world. It is rather the innate capacity to understand, the ability to profit from experience, that distinguishes the bright person from the stupid one.

A dull adult may know a great deal more (have more factual information) than a bright child, yet he may be less intelligent.

Intelligence does grow during childhood. Mental growth parallels somewhat physical growth. Both are most rapid during infancy. The baby who doubles his birth weight during his first six months of life is adding in equally amazing proportions to his mental stature. As the child grows older, his rate of growth slows. Never again will he double his weight in any such short time, and soon comes the time when he will never again increase his size 100 per cent.

So it is also with mental growth. The rate is constantly slower and slower until it is barely perceptible. Finally, just as physically men reach a down-hill side of life when the body is no longer developing but is instead deteriorating, so men reach the point when their mental faculties are not so quick, not so keen as they were in early youth.

Certain mental tasks have been found by psychologists to be indicative of the extent of mental growth, and these have been arranged in a scale of typical performances at consecutive ages. When a seven-year-old boy is found to be able to do the mental tasks mastered ordinarily by the average nine-year-old, he is said to have a mental age of nine years.

You have often heard a teacher say of a pupil that he is "bright for his age." This is just what is meant by the psychologist who tells you that your boy "has a high I.Q." The letters I.Q. stand for "intelligence quotient," and represent a comparison of the child's mental age with his chronological age. Thus the seven-year-old who can do the mental tasks of a nine-year-old has an I.Q. of 9 divided by 7, or 129.

On the mental age scale, the tasks for the nine-year level represent the average performance of nine-year-olds, and the tasks for the ten-year level the average performance of ten-year-olds, and so on. The steps between these levels are not, however, equal. The difference in difficulty between the nine- and ten-year tasks is not nearly so great as that between the six- and seven-year levels.

Adult I. Q.s

By the later teens, too, the intelligence quotient can no longer be figured by dividing the mental age by the chronological age. If this is done, the resulting I.Q. is much too low; making it appear that the intelligence of boys and girls at this age had taken a sudden slump. For this reason, it is important to psychologists and educators giving psychological tests to know what is the average mental age of adults—what is the point beyond which the average person's mind does not grow further.

The first time that mental tests were given to adults in great numbers was during the World War. In order to make some assortment of the many men with many abilities from every walk of life that were drawn into the military service by the undiscriminating draft law, tests were devised by a group

of the most able psychologists in the country and administered to thousands of drafted men.

The "Army Alpha," one of the examinations so administered, when given to 51,620 men, showed that the average score of adults in the army was 59. When this same test was given to school children, it was discovered that this score of 59 was attained by children of 13 years, 12 years and even 11 years.

When the "Stanford Binet" test, a standard "mental age scale" was given to a group of 653 English speaking soldiers of average ability, it was found that they averaged in mental age between the 13-year level and the 14-year level.

For these reasons, psychologists are mostly agreed on using 14 as a basis for calculating the I.Q.'s of all children above that age, assuming for this purpose that 14 is the average mental age of adults.

Of course that does not mean that everyone ceases mental growth at 14. The normal person keeps on growing mentally until about the age of 18. Then there is a sort of plateau, a period during which he does not grow or grows so slowly that it is not perceptible. This is followed by a long period of slow decline in intellectual ability.

Peter Pans

Other persons, however, reach their full mental stature at an earlier age and at a lower level than the average normal person. Some there are who by the time they are eight years old have a mental growth less than that of the average two-year-old baby. These unfortunate persons may continue to develop until they are about 14 years old and grow to about a 3-year mental age. By that time their development is complete; they never grow up mentally; they are intellectual Peter Pans and are called idiots.

Imbeciles, too, cease growing by the age of about 14, but by that time they may have reached nearly a five-year level mentally. Those known technically as "morons" and "borderline" in intelligence may continue growth for a year or two longer and reach something more than eight and ten years of mental age, respectively.

Superior children, on the other hand, may reach the mental age of 14 before they are 12. By the time they are 14, they may be 17 in mental age and still developing.

America is made up of all classes in intelligence. Geniuses and idiots and all the levels in between are found among the 122 million people living in the United States.

America's Mental Age

Chronological Age	*Mental Age*	*Per Cent. of Population in this age group*	*Weighted Average*
Under 10	5	20	100
10 to 19	17 3/12	19	328
20 to 29	17 3/12	17	293
30 to 39	16 8/12	15	250
40 to 49	16 7/12	12	199
50 to 59	15 8/12	9	141
60 to 69	14 8/12	5	73
70 to 79	13 11/12	2	28
Over 80	11 7/12	1	12
		100%	1424

1,424 divided by 100 equals 14.24, the average age for U. S.

If all the men in the United States were measured for their height, it would be found that a few would be extremely tall like the circus giants and a few would be extremely short like the midgets of vaudeville. A great many more would be more than ordinarily tall or short. But a far greater number, the majority, would be just about average height.

So it would be also if all the people in the United States were measured for their mental stature. It would be found that far less than one per cent. could be called geniuses. About 7 per cent. could be called very superior, and these would be balanced at the other end of the line by about one per cent. of feeble-minded (morons, imbeciles, and idiots) and six per cent. border-line. About 13 per cent. would rate as superior, and an equal percentage as dull in intelligence. But fully 60 per cent. would rate as just normal, everyday folks.

Probably the most comprehensive study yet made is the one known as the Later Maturity Study conducted at Stanford University by Dr. W. R. Miles (now at Yale) and his associates. In this research, tests were given to large numbers of persons aged all the way from 7 years to 94.

In this group, which included only persons who could read and write thus eliminating the lower grades of intelligence, it was found that the average mental age of youngsters in their teens is 17 years, 3 months, and the average for the twenties is just the same. In the thirties it has dropped to 16 years, 8 months; for the forties 16 years, 7 months; for the fifties 15 years, 8 months; for the sixties, 14 years, 8 months; for the seventies, 13 years, 11 months; and for the eighties, 11 years, 7 months.

Wide individual differences were observed. A large number of the aged have ability that tests above the average for young persons. And, of course, many a youngster is handicapped with ability very low in comparison with his fellows.

What is America's mental age?

If we assume that those tested in the Later Maturity Study were typical of all the people in the United States, it is possible to use the census figures showing the number in each age group to determine an average mental age for the population. This assumption is a generous one, because the persons tested were all able to read and write and they were the general run of the city population. A higher percentage of the people in institutions and those in isolated districts might be expected to be lower in mentality than the "sample."

47,000,000 Youngsters

A large proportion of Uncle Sam's nephews and nieces—some 47 millions—are youngsters who have not yet attained their mental growth. Another large group includes those who have passed the time of maximum ability and are on a long gradual down slope where experience is used to counter-balance decreasing natural power. Only a comparatively small number are at the peak.

When allowance is made for the age composition of the population in finding the average mental age, it is found that America has an average mental age of fourteen years.

Dr. Segel arrived at his more optimistic figure by ignoring all those below the age of 16 or above the age of 50. Thus he fails to consider the very young and the very old in addition to ignoring illiterates, feeble-minded in and out of institutions, and the senile. His tabulation includes about 62 millions, or just a little over half—presumably the upper half—of the population of the nation. From this section of the population, he estimates a mental age for young adults of 17.7.

This is a high estimate even for those of this age group, because the tests showed the peak of mental ability is reached at the age of 18.

CHEMISTRY

Vitamin D in Lipsticks Banned by Foundation

"KISS the pretty lady, Junior; you haven't had your vitamin D yet today."

That might have been the newest advertising slogan if the Wisconsin Alumni Foundation, holder of patents for the process of irradiation to give vitamin D content, had yielded to the recent pleas of several large cosmetic concerns which wanted to irradiate their lipstick products.

"Get your man with a vitamin kiss," might have been another of the slogans if Dr. Harry L. Russell, director of the Foundation, had decided to sell lipstick rights to the cosmetic manufacturers. But Dr. Russell decided that the cosmetic people were more interested in getting a "splash" advertising slogan than in seeing to it that people got their proper amount of vitamin D, the "sunshine vitamin."

Therefore unless cosmeticians devise some other way of getting vitamin D into their product, they will have to go without the slogans. For similar reasons Dr. Russell has, in recent months, turned down applications from soda water people, chewing gum manufacturers, and candy makers to buy irradiation rights for their respective products. Only the original vitamin oils, cod liver and haliver, and milk are allowed to use the irradiation process to increase vitamin D content and hence anti-rickets value.

Science News Letter, May 12, 1934

ENGINEERING

Travel Comfort Increased by Reducing Shaft Vibration

ITALY, in making her bid for supremacy in transatlantic passenger ships, has already taken long strides in the elimination of seasickness from rolling. Not satisfied with this step ahead, Italian marine engineers are experimenting with machines that will counteract the annoying jar and shudder from high seas and engine vibration.

Everywhere in industry, especially in the manufacture of automobiles, efforts are constantly being made to stop vibration with shock absorbers, rubber cushions, and different arrangements of springs. In a ship, however, although propeller "shake" can be minimized, builders run into difficulties when they try to eliminate it altogether.

Everyone who has fired a shotgun or caught a baseball realizes the truth in the axiom that every action has a reaction. When a large propeller blade turning at high speed slaps the water, it is obviously going to make something shake, and there is no way of breaking the shock with springs. The method which shipbuilders are using to make a ship's motion as smooth as that of Noah's Ark is, strangely enough, to create a new vibration of exactly the same force which will offset the other.

A weight about equal to that of a trolley car is suspended on a beam in the center of the ship, and is made to vibrate up and down by machinery which can be controlled to conform with the speed of the propeller. Very delicate adjustments can be made, and it is found that when this weight gets up to a certain speed of vibration the shake from the propeller suddenly diminishes. Then when the two exactly counteract each other it vanishes altogether.

Science News Letter, May 12, 1934

HISTORY

Islanders Sailed to America Even Before Vikings Came

BEFORE the Vikings, and long before Columbus, America received foreigners who sailed from islands 2,000 miles away.

A critical study of voyages of these daring seafarers was presented before the American Philosophical Society by Dr. Roland B. Dixon of Harvard University. The voyagers came riding in long double canoes from the Polynesian Islands in the tropical Pacific.

That the islanders did have contact with America is shown by the presence of the American sweet potato in Polynesia when Europeans first came there.

While calling the old Polynesians the most skilful and daring navigators among primitive peoples, Dr. Dixon declared that the facts about their extraordinarily long voyages have been greatly exaggerated. The maximum limit of their adventuring carried them not much beyond 2,000 miles, and such ranges were rare.

A voyage of this length, he said, would have enabled Polynesians to reach America from Hawaii or Easter Island, but island tradition is silent on any such voyage. Since the oldest traditional long voyages were made about the tenth century, Dr. Dixon suggested that the New World voyages were earlier.

Science News Letter, May 12, 1934

IN SCIENC

ARCHAEOLOGY

Identity of Olynthos Established by Inscription

THE LONG search of archaeologists for inscriptions and public buildings at ruins believed to be those of Greek Olynthos has been rewarded.

A cable report from Dr. David M. Robinson, of the Johns Hopkins University, who is excavating the ruins, says that the expedition has found fifteen lines of writing proclaiming the alliance of King Philip with the people of Olynthos. The inscription verifies Dr. Robinson's long-held conviction that the site he has been exploring is the real Olynthos, which was a Greek city so important and wealthy that Philip of Macedon looked upon it with eager, envious eyes.

Ancient history records the very alliance with Philip which has now come to light in the city ruins. In 348 B.C., however, Philip swept down upon the city and razed it to the ground, selling the inhabitants at auction.

The expedition has also found the city's arsenal and the place where the public stores were kept.

Apparently the city once suffered from a severe epidemic, and thirty victims of the strange malady have been found buried together.

Science News Letter, May 12, 1934

MEDICINE

Test Tube Replaces Cow In Vaccine Production

ACCIDENTS following smallpox vaccinations will probably be fewer in number as a result of a new method of producing the vaccine just announced by Dr. Thomas M. Rivers of the Rockefeller Institute for Medical Research. Instead of growing the virus for the vaccine in cows, Dr. Rivers and associates have found a way of growing it on living cells in a test tube. This insures a product free from contaminating organisms which have occasionally been a source of trouble in the past.

Science News Letter, May 12, 1934

NCE FIELDS

ASTRONOMY

Phosphorus Found in Sun; Score Is 59 Out of 92

PHOSPHORUS has been given its place in the sun. It is the 59th of the 92 chemical elements to be found in the spectrum of the sun.

Dr. Charlotte E. Moore of the Princeton Observatory inspected solar spectrograms of the infrared or heat region of the sunlight made by Dr. Harold D. Babcock at Carnegie Institution's Mt. Wilson Observatory, Calif., and compared them with spectra of phosphorus light photographed in the laboratory by Dr. C. C. Keiss, U. S. Bureau of Standards, Washington, D. C. Five lines in the two tell-tale spectra of earth and sunlight corresponded in position and intensity, good proof that phosphorus exists in the sun.

Astronomers feel confident that all of the chemical elements exist in the sun and will be eventually discovered.

Science News Letter, May 12, 1934

ZOOLOGY

Fashion Demands Cause Massacre of Reptiles

THE FASHION of using the skins of snakes and lizards for shoes, handbags, house decorations, and even for dresses and hats, is creating a number of unusual problems for zoologists.

Figures collected by the Reptile Skins Committee of the Imperial Institute, London, show that the number of reptile skins exported annually by India alone has risen from some 2,500,000 in 1932 to about 4,500,000 in 1933.

By far the largest trade is in lizard skins. Of these 4,248,480 were exported from Calcutta last year. The Calcutta export totals under three heads were listed as: crocodiles, 72,213, pythons, 6,122, and other snakes, 56,789. Reptle skin exports from British Malaya have increased from nine tons in 1931 to 1,749 tons in 1933.

Zoologists have mixed feelings about this rapid increase in the reptile-skin trade. H. W. Parker, assistant keeper of zoology, at the British Museum and a member of the Reptile Skins Committee, states that he was in favor of the trade only so long as certain protective measures were observed. Nearly all snakes should, he considers, be protected by law during their breeding season, while the slaughter of young snakes should be prevented by imposing a minimum size limit. He suggests that the killing of lizards of less than seven inches maximum girth should be prohibited, and that the minimum permissible width for the skins of boa constrictors and pythons ought to be eight inches.

Apart from its zoological aspect, the extermination of snakes, however poisonous, is not necessarily desirable even from the viewpoint of the ordinary inhabitants of the areas where they are found, Mr. Parker points out. Most of the snakes prey on rodents, which would in many instances increase enormously, to the serious disadvantage of man, if their natural enemies disappeared.

Moreover, several harmless reptile species have already been almost exterminated by wholesale slaughter, whereas if closed seasons had been imposed a good supply of them would have been available indefinitely. The species in most danger are those only found within a restricted geographical area, however plentiful they may at present be within that area.

Science News Letter, May 12, 1934

PUBLIC HEALTH

Find Aluminum Utensils Not Dangerous To Health

DAILY INGESTION of small quantities of aluminum, such as might result from the use of aluminum cooking utensils or of certain chemical yeasts containing aluminum, is not dangerous and does not induce cancer, as some have feared.

This is the conclusion arrived at by Drs. Gabriel Bertrand and Pierre Serbescu of the University of Paris as the result of experiments on rabbits, which they have recently reported to the Paris Academy of Sciences.

These experiments seem to confirm the results of American investigators who found aluminum cooking utensils harmless.

Science News Letter, May 12, 1934

A sandal made a thousand years or more before the Christian era was found in Carlsbad Caverns, N. M., showing that Indians knew the caves long ago.

ETHNOLOGY

Plains Indians Liked Two-Handed Tools

INDIAN tool makers, working with stone, had pretty definite ideas in their heads as to what a tool should be like.

A study of several hundred ancient tools of the sort known as sidescrapers has been made by Miss Betty Yelm of the University of Denver, to learn whether these implements were right-handed, left-handed, or ambidextrous. Miss Yelm said that from 60 to 80 per cent. of the scraping tools she examined were intended for use with either hand. The tools were made by Plains Indians of Colorado, Wyoming, and Oklahoma. A preference for right-handed or left-handed tools—if an implement was not to be made for ambidextrous use—was found typical of certain districts.

Science News Letter, May 12, 1934

ORNITHOLOGY

Eagle So Tame It Eats From Hand

TAMING the eagle, our fiercest bird of prey, is about as startling news as a man biting a dog.

Great Smoky Mountains National Park, in North Carolina and Tennessee, has a tame eagle. It is vouched for by Park Superintendent J. Ross Eakin who, in making the report to the National Park Service authorities in Washington, says, "Sounds like a whopper—but it is not."

Early in March two golden eagles that had been held for two months in cages in the park were liberated. They had been captured in the Cumberland Mountains. Ornithologists recommended that they be held in captivity until warm weather in order that they might have less trouble in securing their natural food, which might induce them to adopt the park as their home.

Upon being liberated, one eagle apparently left the park at once; at least it has not been seen since.

But the other proceeded to make ornithological news. It has become quite tame. When not hungry it soars around like any other eagle, but when in need of food it alights and takes meat from a ranger's hand. The ranger is convinced that it has quit hunting for its own food and gone to panhandling. Perhaps it believes that the world now owes it a living.

Science News Letter, May 12, 1934

PHYSICS

3,500,000 Volt Gamma Rays From Artificial Radioactivity

THE MOST powerful radiation shot out from an atom here on earth, gamma rays of 3,500,000 volts, are produced when scientists at the California Institute of Technology "pull the trigger" of artificial radioactivity produced in the latest atom smashing.

Dr. R. A. Millikan told the National Academy of Sciences that his Pasadena colleagues, Drs. C. C. Lauritsen and H. R. Crane, had flung heavy hydrogen atoms at ordinary carbon in their giant million volt X-ray tube to such effect that there were produced gamma rays nearly a million volts more powerful than the strongest from naturally radioactive elements.

They worked with bombarding streams of particles hundreds of thousands of times as intense as the naturally radioactively produced helium particles with which Mme. Irene Curie-Joliot, Mme. Curie's daughter, and her husband, Prof. F. Joliot, produced the first artificial radioactivity just a few weeks ago.

So far artificial radioactivity has been produced in a dozen or more different ways. In every case it is a new kind of radioactivity unmatched in nature. The bombarding particles, either light or heavy hydrogen or helium atoms, join with the element attacked. A new unstable atom is formed and then after a while it explodes, giving off positive electrons in most cases in addition to gamma rays. In natural radioactivity the atoms doing the exploding are very heavy contrasted with the light atom that can be made artificially radioactive. In natural radioactivity also electrons are negatively charged instead of positively charged. In some of the complicated processes, which are very beautifully and mathematically expressible by the physicists, neutrons are produced.

So rapid is the experimental progress that Dr. Lauritsen decided at the last minute that he could serve science better by staying at Pasadena and continuing experiments than making the long trip to Washington to speak before the academicians and Dr. Millikan therefore presented his paper.

Experiments by Dr. Carl D. Anderson and Dr. Seth Neddermeyer, also reported by Dr. Millikan, showed that artificial radioactivity energies are unaffected by the intensity of the bombardment that gives birth to them. The flinging of atoms acts as a trigger and the unstable atoms created then proceed to blow up, always with the same general range of intensity of the particles and rays.

Science News Letter, May 12, 1934

ARCHAEOLOGY

Rare Bible Manuscript Comes to America

THIRTY LEAVES of Bible manuscript written in the third century A.D. and containing large sections from the Epistles of Paul have been acquired by the University of Michigan, and preliminary study shows that they will bring added light on the order in which the world's most famous letters were written.

Prof. Henry A. Sanders of the University of Michigan made this announcement recently, speaking before the American Philosophical Society.

Biblical manuscripts of early Christian centuries are rare and extremely important to scholars seeking to trace the earliest word forms in which the New Testament was expressed. Since every copy of the Bible was hand written until the invention of the printing press, for many centuries no two copies were exactly alike, due to human inability to copy so large a work without making mistakes.

The University acquired its 30 leaves of the Bible in London. The text, written on papyrus, apparently was part of a Bible in a Christian church or monastery in Egypt. This ancient Bible first came to light in 1930, when A. Chester-Beatty purchased 190 leaves of it, and it was tentatively concluded that the various portions were written in the second, third, and fourth centuries.

At the time, it was supposed that all of the existing leaves were acquired by Mr. Chester-Beatty, Prof. Sanders said. The Chester-Beatty papyri included ten rather fragmentary leaves of the letters of Paul. The recent discovery, however, of thirty additional and better preserved leaves of the epistles suggests, he said, that as usual the Arab finders held back large sections of their find which will later come on the market at higher prices.

Preliminary study of this third century version of Paul's missionary letters is very enlightening as to problems of the text, Prof. Sanders reported. A distinctly Egyptian character of text has been noted, he said. In a comparison with certain types of Bible text that existed at the time, Prof. Sanders finds significant points of likeness and of difference. The manuscript is believed to have been written so early that it escaped the influence of the revised texts that began to appear in the great cities near the end of the third century.

Science News Letter, May 12, 1934

ASTROPHYSICS

Sunspots Related To Magnetic Storms

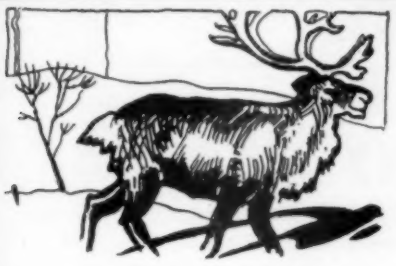
SUNSPOTS, which are beginning to freckle the sun's face again after a season of relative scarcity, appear to have an intimate connection with the occurrence of sharp fluctuations in the earth's magnetic field, causing trouble with telegraphic instruments and other upsets. So A. G. McNish of the Carnegie Institution of Washington stated, in the course of an address before the annual meeting of the American Geophysical Union.

"When sunspots are most numerous, magnetic storms occur most frequently," he said. "The storms temporarily change the earth's magnetism. After the storms are over, the earth's magnetism returns to its original condition, for which reason it is not possible to attribute the gradual long-time changes to the action of the sun."

Science News Letter, May 12, 1934

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone



Giant Killer

MAN'S CHIEF conquests have always been against creatures bigger than himself.

The first human beings about whose habits we have any definite notions at all were killers of large game. The men of the Old Stone Age, who drew pictures of the animals they hunted on the walls of caves, have left us records of woolly mammoths, rhinoceroses, wild horses, reindeer, bison and other quarry worthy of the bow and the spear of any later Nimrod. Some of these the cave men did kill with spears (apparently they had no bows), and some they got by driving their herds over cliff-edges or enticing single giant specimens over cunningly concealed pitfalls and then pounding them to death with great stones.

The bones left in the refuse-heaps, or worked up into tools and weapons, give further evidence of the predominance of large animals in the game list of early man.

Whether Stone Age man's hunting actually wiped out any of his contemporary animals which became extinct is not certain. Possibly climatic or other factors were more important in their extermination. But there is no doubt that hunting played a large part in the extinction of large animals in later times: the aurochs or wild ox of Europe in the Middle Ages, that big, lubberly bird, the dodo, in early modern times. Hunting pushed chamois and ibex close to extinction in Europe, bison and pronghorn in North America, is now threatening elephants in both Africa and India, and kangaroos in Australia.

But man, mighty hunter though he is when he turns his wits and weapons against the big brutes, has been far less deadly against little animals. Mice and rats swarm in his very houses, despite traps and poison, terriers and cats. Squirrels and rabbits still survive, sometimes in huge numbers, in timber and brushland areas where the last bears and wolves were killed decades ago. Muskrats survive in places trapped clean of beavers away back when beaver hats were the latest style.

Alligators have been shot out of Southern waters to an alarming extent, and if man had been on earth in the days of the dinosaurs (which he wasn't, comic-strip artists to the contrary notwithstanding) he would have conquered these great reptiles also. But neither modern hide-hunters nor Alley-Oop could possibly eliminate lizards, frogs and toads.

Science News Letter, May 12, 1934

ARCHAEOLOGY

Indian and Civil War Relics Dug From Shiloh Battlefield

DIGGING at the battlefield of Shiloh, overlooking the Tennessee River, CWA workers have unearthed Civil War cannon balls and a large prehistoric Indian settlement.

Dr. Frank H. H. Roberts, Jr., of the Bureau of American Ethnology, directed the work.

Reporting discoveries of the expedition, Dr. Roberts said that Confederate lines on the first day of the Battle of Shiloh were right among the old Indian mounds. The ground is richer in battle relics than in prehistoric objects. The excavations, however, have revealed the plan of the large ancient settlement spread there.

The part of the battlefield which contains the Indian settlement was exceptionally situated for protection. High bluffs surrounded the settlement site on three sides and on the fourth the Indians raised a palisade fence. Within this enclosed area, they built mounds of earth on which to set temples and government buildings. Scattered among the mounds they built smaller houses.

Dr. Roberts found post holes marking the palisade and traces of about 30 Indian houses. Exploring the mounds, the excavators found one small mound that was a cemetery containing 30 skeletons. The larger mounds were barren of bones or Indian-made objects, and Dr. Roberts infers that they were used as refuge for floods. Tree roots threading down into the mounds effaced any post holes that would have shown where buildings stood.

Identity of the Indians who built the stockaded mound center is not yet determined, Dr. Roberts said. Nor is it certain when they lived, except that they antedated the coming of white men. It is thought possible that they belonged to the wide-spread proto-Muskhogean Indian peoples, who were ancestors of the highly cultured tribes found by the white explorers in the Gulf States.

Science News Letter, May 12, 1934

CHEMISTRY

Washing With Linseed Oil Removes Stains from Skin

HOUSECLEANERS can take spots of lacquer, dye, etc., from their hands with the old familiar paint ingredient, linseed oil. So says *Industrial and Engineering Chemistry*, quoting a German source.

About a thimbleful of the oil is all that is necessary. Rub it thoroughly over the hands until the offending spots are "out"; then, without removing the oil, wash the hands in warm water with plenty of soap. The soap takes off the stain and the excess oil, but leaves enough of it to keep the skin soft and smooth.

Science News Letter, May 12, 1934

DEAD MEN MADE ALIVE

Scientific sleuths have gathered together the available evidence about Tibetan magic. The most trustworthy authorities have vouched for such facts as: Men made to rise from the coffin by the beckoning eye of the Dalai Lama; a beggar stabbed through the heart and healed almost instantaneously. What's behind all this? You can learn in

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EVOLUTION

Two Ancient Reptilian Skulls Represent Link With Mammals

Most Important Evolutionary Links Ever Discovered, Noted London Paleontologist Says of Karroo Fossils

TWO FOSSIL skulls, almost midway between reptiles and mammals, in the Bloemfontein Museum, South Africa, represent one of the most important evolutionary links that have ever been discovered. This is the opinion of Dr. D. M. S. Watson, professor of zoology in the University of London, now visiting the American Museum of Natural History, New York.

The specimens belong to an extinct order of mammal-like reptiles found almost exclusively in the famous fossil-bearing Karroo formations of South Africa. The skulls are about the size of those of a large rat and are estimated to be around 150,000,000 years old. Technically they are reptiles but actually they are so close to mammals that scientists are almost willing to admit that they are that rarest of paleontological treasures, a real missing link.

Only a very general description of the fossils has been published but this has been sufficient to enable zoologists to recognize their significance as standing nearly on the midline between two great classes of animals. They have been put in a whole suborder by themselves and pending further description are known as Ictidosauria A and B.

"The importance of these fossils in the history of evolution," said Dr. Watson, "can hardly be overestimated. The fragments of the skeleton that have been found show some resemblance to that of one of the egg-laying mammals of Australia. The publication of further details is a matter of greatest interest not only to the research workers in this field but to students. For, as soon as careful measurements and drawings are available, some account of these specimens should occupy an important place in text books and courses on evolution."

The Karroo formations, in some places 20,000 feet thick, cover over half of the area of the British Dominion of South Africa and give a practically unbroken fossil record during a period of about 60,000,000 years.

The Ictidosaurians come from the topmost and consequently the most recent layer. The order of reptiles to which they belong and which are peculiarly characteristic of the Karroo beds, branched out into many families of strange and misshapen creatures. Long before the dinosaurs rose to their prime, however, the nearest relatives of the Ictidosaurians began to assume a shape not unlike that of a rather large-headed dog or wolf.

RADIO

BEE BEHAVIOR

an address by

James I. Hambleton

Senior Apiculturist, Division of Bee Culture, Bureau of Entomology, U. S. Department of Agriculture

Wednesday, May 16, at 3:30 p.m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

For example, the typical reptilian jaw is made up of several bones but in mammals there is only one. In these creatures the bone in the front of the jaw became large and shaped like that of mammals while the remaining bones stayed small. In the two Ictidosaurians the bones at the back of the jaw, now very tiny, are the only reptilian trait left in the skull. In man himself some of these bones from the back of the reptilian jaw still survive in the hammer, anvil and stirrup bones of the middle ear cavity.

The whole group of mammal-like reptiles, which are extremely important in the study of evolution, are not well represented in the museum and university collections of the world, Dr. Watson pointed out. The largest number are found in the Cape Town, the British and the American Museums. There are two small collections in Germany and one in Chicago. Dr. Watson has an extensive private collection.

During his stay in the United States Dr. Watson is studying primitive American ancestors of the mammal-like reptiles of Africa that are found in very early geologic formations in Texas.

Science News Letter, May 12, 1934

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ASTRONOMY

Large White Spot Seen On Jupiter

A LARGE white spot on the planet Jupiter was sighted on April 29 by Prof J. J. Nassau of the Warner and Swasey Observatory, Cleveland. It is an outstanding mark on the south equatorial belt and it is 20,000 by 2,000 miles in size. Probably a gigantic storm or disturbance in the planet's atmosphere caused the spot.

Science News Letter, May 12, 1934

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Industry's Seamstress .....The Front Cover
By Earthquake to El Dorado.....Page 5
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From the Breast of a Tiger Knight..... 11
Teddy-Bear, Climb for Your Life..... 13
Like a Jewel From Fairyland..... 15
Famous Canyon Now National Monument..... 17
Good Heavens, Young Lady !..... 19
Web-Fingered, to Swim the Air..... 21
Where Ambition Ended 23
"Ol' Man Ribber's" Treasure..... 25
Spiny Sculpin Uses Chinese Camouflage..... 27
Two Precious Jewels in His Head..... 29
Not a Fairy's Furry Opera Cloak..... 31
New Atom-Smashing Machine 33
Warning Spots or Targets?..... 35
Festooning the Evergreen Tree..... 37
115 Miles-per-Hour at a Standstill..... 39
Young Gargoyle Out for a Walk..... 41
World's Longest Suspension Span..... 43
Wind-Blown Lightning 45
Died, Despite Skill of Ancient Surgeons..... 47
Source of Four-Mile-a-Minute Storm..... 49
Madame Python Accepts Family Cares.....Page 51
Paschal Flower of the Prairies 53
55-Ton "Top" to Make Ship Ride Smoothly..... 55
New Picture of Ancient Splendor..... 57
Machine Arm of a New National Link..... 59
First Control of Hydro-Power 61
Smoke Whirlwinds in Organ Pipe..... 63
Domed Nursery of a Flying Jewel..... 65
Myriads of Sisters, But No Twin..... 67
Albino Twins Surprise Robin Parents..... 69
Showerbath of Sparks..... 71
She-Wolf Guards Her Young..... 73
Dneprostroy's First Spring Freshet..... 75
Strength of Steel Written in Sand..... 77
Grotesque Parents; Grotesque Offspring..... 79
In the Form of a Dove..... 81
Astronomical Observatory or Bloody Altar..... 83
By Hiding, the Sun Reveals Itself..... 85
It Will Be Over in Five Minutes..... 87
In a New Pose..... 89
Ho-Hum! Even the Cat Gets It..... 91
Bucketed Harnesser of Power..... 93
New Flame From Billions of Particles.....The Back Cover

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(19164)

CHEMISTRY

Triple Weight Hydrogen Made From Deuterium Atoms

Existence of Third Isotope Proved by Mass Spectrographic Method; New Helium Now Sought

DIRECT proof of the synthesis of matter has been brought to light by the discovery of a new heavy, heavy hydrogen atom of mass three. The discovery resulted from experiments conducted by Drs. Gaylord P. Harnwell, Henry D. Smyth and Walker Bleakney, W. Wallace Lozier, P. T. Smith, S. N. VanVoorhis, and J. B. H. Kuper, of the Princeton University department of physics.

Through these experiments there have been found minute traces of this very heavy variety of hydrogen of mass three in a sample of almost pure hydrogen of mass two supplied by Prof. Hugh Taylor of the department of chemistry. The scientists were able to do this by using a mass-spectrograph of very high sensitivity recently constructed in the Palmer Physical Laboratory at Princeton by Drs. Bleakney, Lozier and P. T. Smith. This apparatus is capable of detecting one part of hydrogen of mass three in a million of mass two and in the sample analyzed actually recorded one part in two hundred thousand.

This experiment has served to prove the existence of this third isotope of hydrogen in a stable form in nature and has given an estimate of its abundance. Apparently it is present to less than one part in a billion of ordinary hydrogen.

Lord Rutherford and his associates at the Cavendish Laboratory in Cambridge, England, have obtained evidence that when two atoms of heavy hydrogen, which have a mass of twice that of ordinary hydrogen, strike one another with sufficient energy a process of atomic transmutation takes place. These two atoms of mass two probably coalesce into an unstable atom which flies apart, not as the two atoms of mass two from which it was formed, but as one atom of mass one which is ordinary hydrogen, and one of mass three which is a variety of hydrogen heavier than any previously known. The evidence for the existence of this third very heavy hydrogen has been of extremely indirect nature until the completion of these experiments at Princeton. An experiment of the same nature as that of Lord Rutherford's has been performed by Drs. Harnwell and Smyth with the assistance of Drs. VanVoorhis and Kuper. Some hydrogen of mass two was bombarded for a considerable time by more of the same hydrogen and later the resultant mixture drawn off and analyzed in the mass-spectrograph by Drs. Bleakney, Lozier and Smith. It was found that after this process the ratio of hydrogen three to that of hydrogen two had increased from the original ratio of one part in two hundred thousand to about one part in five thousand. The only adequate explanation appears to be that the transmutation process postulated by Lord Rutherford actually occurs.

This recent experiment is the first instance where any atomic species has been produced artificially in sufficient quantity to analyze and detect by other than radioactive means. The continuation of this work is being undertaken by Drs. Harnwell and Smyth with the purpose of producing larger quantities of this heavy hydrogen and of attempting to detect by the same method a second possible variety of helium of mass three instead of the ordinary sort with mass four.

Dr. Bleakney reported the discovery to the American Physical Society meeting at Washington.

Science News Letter, May 12, 1934

PHYSIOLOGY

Yoga Rites Give Science New Facts About Breathing

SCIENCE has turned to the mysticism of India to discover new facts about breathing. For nearly two years a young Hindu graduate student at Yale University, K. T. Behanan, returned to his native India to subject himself to the practices of the cult of Yoga in the hope that psychology and physiology would be benefitted. In this scientific excursion into routine practices associated with mysticism Mr. Behanan had the guidance and cooperation of Dr. W. R. Miles of the Yale Institute of Human Relations. Dr. Miles and Mr. Behanan presented to the American Physiological Society preliminary results for the graphic pictures of these breathing patterns and careful determinations of the oxygen used by Mr. Behanan's lungs while he performed the intricate breathing exercises taught him by a noted Yoga practitioner.

Unusual breathing methods are a part of the rigorous religious regimen of the Yoga cult, which dates from the third century B.C. Extreme variations from ordinary breathing habits are learned by Yoga disciples and used daily for periods of from one to several hours.

Because peculiar breathing methods are not confined to these religious mystics but are used in sports and industry, their physiological significance may have theoretical or even immediate practical application in our modern Western world. Pearl divers often are able to hold their breath for unusual lengths of time, over-ventilating lungs with unusual amounts of oxygen. Expert swimmers develop breathing rhythms that give them record-winning advantages.

Kapalabhati, Ujjayi, and Bastrika were three of the breathing exercises learned by Mr. Behanan and practiced by him for twenty months of adherence to the Yogic routine.

The Indian mystics use Yoga breathing exercises in order to induct themselves into the proper physiologic state for beginning their particular type of religious contemplation.

Physiologists were interested in Dr. Miles' report that the oxygen consumption of Mr. Behanan during the Yoga breathing was increased about twenty per cent. over that of his ordinary breathing. This was followed by a reduction of about four per cent. during 15 to 20 minutes succeeding the exercise. This Yogic breathing was at the rate of one breath per minute or slower.

Science News Letter, May 12, 1934

•First Glances at New Books

Embryology-Genetics

EMBRYOLOGY AND GENETICS—Thomas Hunt Morgan—*Columbia Univ. Press,* 258 p., $3. This book, which combines in a new way a number of elements ordinarily presented as parts of different courses in college zoology, suggests an excellent unified course that should put into the student's mind a better ordered, more unified knowledge of the steps and processes involved in reproduction and heredity. The selection and arrangement of the matter, its style of presentation and illustration, are all that one might expect from its distinguished author.

Science News Letter, May 12, 1934

Zoology-Anthropology

MAN'S PLACE AMONG THE ANTHROPOIDS—William King Gregory—*Oxford,* 119 p., $2.50. Three lectures on the evolution of man from the lower vertebrates, presented at University College, London, and here gathered into book form, by one who has established himself as a master of both the exacting science of comparative anatomy and the difficult art of presenting its often abstruse results in simplicity and clarity that will appeal to the lay as well as to the scientific audience. The figures and charts, though few, are worked out with convincing clarity.

Science News Letter, May 12, 1934

Geography

THE DISCOVERY OF THE AMAZON—José Toribio Medina, translated from the Spanish by Bertram T. Lee—*American Geographical Society,* 467 p., $5. For three centuries historians hurled the name traitor at the Spanish Conquistador Francisco de Orellana, thereby damaging the fame of the man who first voyaged down headwater streams on Andean slopes, advancing thence from one connecting stream into another until he reached the main body of the great Amazon River. About forty years ago, Sr. José Medina gathered documents relating to Orellana's career and published them, with a strong defense of his character. This Spanish volume has now been translated into English and edited by Prof. H. C. Heaton; so that Medina's work may at last reach the audience he hoped to convince. Only 200 copies of Medina's book were printed in the Spanish edition, and it has never gained the notice it deserved.

Science News Letter, May 12, 1934

Horticulture

THE PRACTICAL GARDEN NOTEBOOK—Ellen Browder Bean—*Author (Chicago),* $2.50. A solid, substantial notebook cover, with correspondingly substantial index sheets to separate the pages, and blanks enabling the gardener to record—in any detail desired—the achievements and incidents of the growing season. It will be useful to all kinds of garden-makers, from the beginner struggling with his first crop of weeds to the veteran botanist. With a guide like this for the making of your garden's history season by season, it will be easier to duplicate past triumphs and avoid repetitions of past failures.

Science News Letter, May 12, 1934

Horticulture

THE JUNIOR GARDENER—Dorothy W. Greene and Rosetta C. Goldsmith—*Vanguard Press,* $1.25. A pleasantly gotten up little book for little gardeners. Tells in short words how to make the garden, what to plant and how to cut and arrange the flowers. Wisely, the authors permit their small pupils to have the thrill of learning "big names" like *Rudbeckia, Dianthus, Helichrysum.*

Science News Letter, May 12, 1934

Physics

THE THERMODYNAMICS OF ELECTRICAL PHENOMENA IN METALS—P. W. Bridgman—*Macmillan,* 200 p., $3.75. This book brings together the substance of a number of papers written during the past ten years by the well-known electrical engineer and physicist of Harvard. It makes application of classical thermodynamics to electrical phenomena amenable to thermodynamic treatment.

Science News Letter, May 12, 1934

Child Health

A HEALTH PROGRAM FOR THE CHILDREN OF A COUNTY—Thomas Gordon Bennett—*Teachers College, Columbia Univ.,* 196 p., $2. Dr. Bennett has made a careful study of child health and facilities for promoting it in Queen Anne's County, Maryland. The report of this study and his program may prove helpful to health officials.

Science News Letter, May 12, 1934

Physics

RESONANCE RADIATION AND EXCITED ATOMS—Allan C. G. Mitchell and Mark W. Zemansky—*Macmillan,* 338 p., $5. Resonance radiation is a powerful means of obtaining information concerning the interaction of light and matter. It is a form of light and is intimately connected with atoms and their structure. This book is a comprehensive account of the theories, experiments and interpretations since the discovery of resonance radiation by R. W. Wood in the early part of the present century.

Science News Letter, May 12, 1934

Zoology

MORE ABOUT ANIMALS—Margery Blanco—*Macmillan,* xii+115 p., $1.75. A whole series of interesting pets introduced in amusing anecdotes, with attractive black-and-white pictures. For anyone who likes animals (and we all do) this book should make a very pleasant gift.

Science News Letter, May 12, 1934

Medicine

TWENTY-FOURTH REPORT—*Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis,* $2 plus postage. This collection of reprints on all phases of tuberculosis will be helpful to workers in this field and to physicians in general. The material is, of course, too technical for the lay reader.

Science News Letter, May 12, 1934

Industrial History

HISTORY OF THE BREWING INDUSTRY AND BREWING SCIENCE IN AMERICA—John E. Siebel and Anton Schwarz—*Siebel-Schwarz Memorial, Chicago,* 260 p., $3.

Science News Letter, May 12, 1934

Research

ANNUAL REPORT OF THE DIRECTOR TO THE BOARD OF TRUSTEES FOR THE YEAR 1933—*Field Museum of Natural History,* 136 p., $1.

Science News Letter, May 12, 1934

Physiology

TRANSPORTEURS D'OXYGENE—Marcel Florkin—*Hermann & Cie, Paris,* 38 p., 12 fr.

Science News Letter, May 12, 1934

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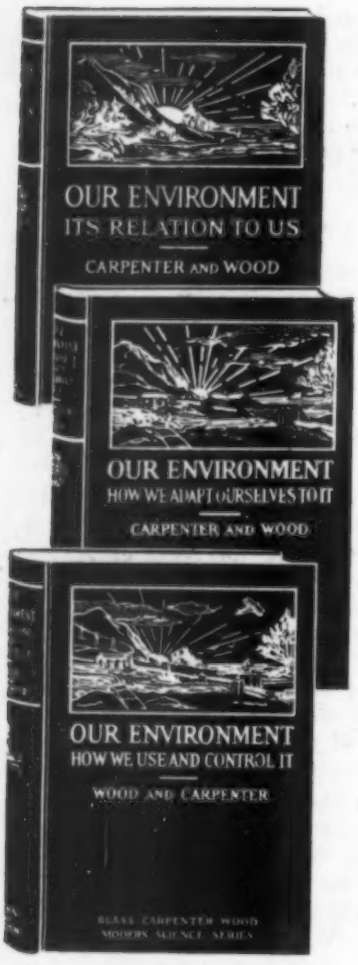
NEW SCIENTIFIC DISCOVERIES

THE MAGIC of new scientific discoveries fires the imagination of youth. These new discoveries necessitate revisions in every school course in science which seeks to do justice to recent progress.

In aviation, the Lindberghs recently made a trail-blazing trip. Frank Hawks uses an automatic pilot for his latest plane, and air brakes, and a beautiful stream-lined design.



The famous Sikorsky American Clipper of the Pan-American service is one example of the latest in modern commercial transport planes. Commander Settle arouses youthful enthusiasm with his trip to the stratosphere. We have a new wingless auto-gyro. We have larger and swifter transport planes than ever before.

In land travel, the new stream-line train of the Union Pacific is being exhibited. The Texas and Pacific has a stainless steel, gas-driven train. There is a new V 8 gas engine. The Diesel engine offers promise of many improvements.

In water travel, the great ocean liners have reached a new peak of efficiency. The most recent submarine shows improvements which have an especial fascination for youth.

In the useful field of home conveniences, there are new methods of refrigeration; washing machines; vacuum cleaners; thermostats for cooking and heating; improvements in home lighting, air conditioning, and sanitary equipment.

Radio and telephone communication have recently improved. There is now transocean and ship-to-shore service. Pictures are sent by radio. We have the modern radio tube.

Television made new strides. The infra-red filter has improved photography. The photo-electric cell; the neon tube; the cosmic ray; sound pictures; the quantum theory all are new and interesting developments of science which make their appeal to young minds and which call for explanation.

The ideal modern science series, which might aptly be called the What, How and Why of Science, uses the alluring material described above in achieving the two great objectives of scientific study.

These two definite, practical purposes are, first, to furnish a fund of scientific information to help young pupils interpret their environment. Second to attain a habit of clear thinking from cause to effect and back from effect to cause.

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